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(HBCU/MI 92-93) A CLUSTER WORKSTATION FACILITY
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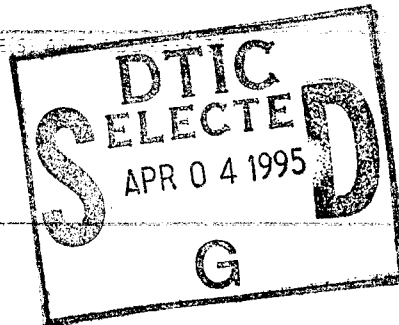
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13. ABSTRACT (Maximum 200 words)

The original grant was for eight workstations for the cluster.  We were able to
increase this number and still stay within the cost estimate through competive
bidding and sale prices.  We purchases CLinda for software development and have
installed PVM.  PVM is free so it does not appear above.  The cluster workstations
is now being actively used by several faculty members for research.

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Final Technical Report for Research Foundation Grant #447322
DoD-SDI    Grant Number F49620-93-1-0602
Principal Investigator Theodore Brown, Department of Computer Science, Queens
College of CUNY
Expiration date 9/30/94      Report date: December 8, 1994

The following items were purchased through the use of the grant funds:

| Item # | Manufacturer and Model | Cost | Remarks |
|---|---|---|---|
| 1 | Sun workstation cluster consisting of the following:<br>a) Sun Sparcserver 1000 with 4 processors, 256MB RAM, 15GB disk, 5GB tape, CD-ROM, SPARCprinter<br>b) 13 Sun Sparcstation 10/40s with 32 MB RAM, 1GB disk | $ 202778.56 | |
| 2 | Scientific Computing Associates' C-Linda software for the Sun cluster | $ 1980.00 | Distributed system software |
| 3 | Wolfram Research's Mathematica for Sun Solaris | $ 1395.00 | Symbolic computation software |
| 4 | Macsyma for Sun Solaris | $ 699.00 | Mathematical computation software |
| 5 | KBVISION for Sun Solaris | $ 1003.79 | Image-processing, and vision software |
| 6 | Cabletron Network Repeater | $ 634.00 | Network hardware for Sun cluster network |
| 7 | Microconnection's Network components | $ 660.00 | Network accessories |
| 8 | Numerical Algorithm Group's Fortran Library for Sun Solaris | $ 597.00 | Software libraries |
| 9 | FrameMaker for Sun Solaris | $ 2890.00 | Presentation software for the Sun cluster |
| 10 | CACI Inc. COMNETIII, and SIMSCRIPT II.5 for Sun Solaris | $ 1800.00 | Simulation software for the Sun cluster |
| 11 | Adobe Inc.'s PHOTOSHOP for Sun Solaris | $ 1595.00 | Image handling software |
| 12 | Zenith Inc's Pentium-based multimedia PC | $ 4910.00 | For presentations, and demonstrations |
| 13 | Zenith Notebook computer | $ 4600.00 | For off-campus presentations |

| 14 | Netmanage Chameleon/X | $ 817.65 | X-windows server software for PC |
|----|----------------------|----------|----------------------------------|

Notes on the purchase:
• The original grant was for eight workstations for the cluster. We were able to increase this number and still stay within the cost estimate through competitive bidding and sale prices.
• We purchased CLinda for software development and have installed PVM. PVM is free so it does not appear above.

The cluster of workstations is now being actively used by several faculty members for research. The status of the projects described in the award statement are:

Distributed Simulation
A Ph.D. student, mentored by Professor Theodore Brown, the PI, is currently completing her thesis on applying techniques to make GPSS programs easily run on distributed computer systems. She has made use of our network and CLinda to explore the idea of using the LP (logical process) structure inherent in a GPSS program (e.g. blocks of statements that start with a generate block in which transactions remain, until possibly they are terminated). If successful this would be an easy way for simulation programs to be run in parallel.
A second project will be undertaken soon by the PI of this grant to study if replicating parts of a discrete event simulation provides sufficient speedup as to make it a worthwhile idea. There may be an experimental component to this aspect.

Level Graphs
Professor Jerry Waxman, one of the Co-PIs, has continued his studying of network routing problems in which there is "layering" of the arcs of the associated network into "levels," what he has called "level graphs." In previous papers he has shown that new algorithms applied to graphs that can be considered level graphs are computationally superior to well known methods. Research to be undertaken soon, using the cluster of workstations, will allow them to experimentally explore the tradeoffs between path quality and computational complexity in the several level graph heuristic algorithms they have proposed. A student has started to do this.

Distributed Vision
Professor Ari Gross, the second Co-PI, will in the near future make use of the cluster to investigate his most recent research ideas of "tube" world. He has recently published a number of articles on this topic. He will make use of the pyramidal type algorithms on the cluster for recognition algorithms.